

# **ANEJO 3**



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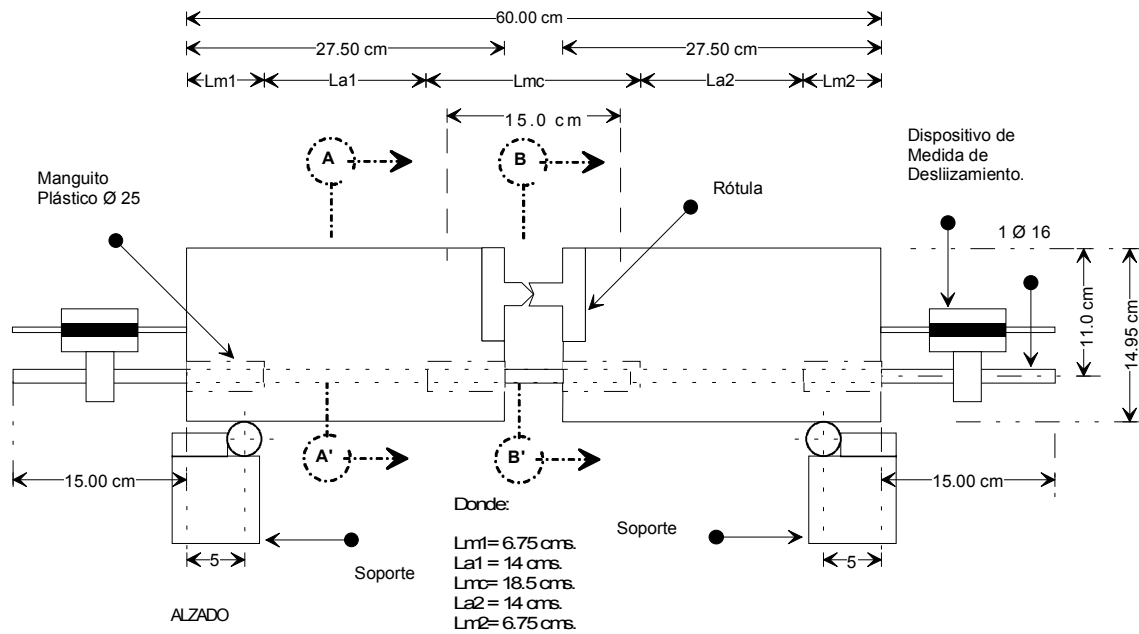
#### CÁLCULO DE TENSIONES DE ADHERENCIA

##### 3.1- INTRODUCCIÓN

##### OBJETIVO:

Este procedimiento tiene por objeto exponer la metodología general seguida para el cálculo de las tensiones de adherencia, a partir de los datos registrados en las diferentes series de ensayos adherencia por flexión.

##### SERIE EA\_ ACE



$$M = \frac{P}{2} \times \left( \frac{l}{2} \times \frac{a}{2} \right) = \frac{P}{4} \times (l - a)$$

$$T = \frac{M}{z}$$

$$T = \tau \times \text{perimetro} \times ld$$

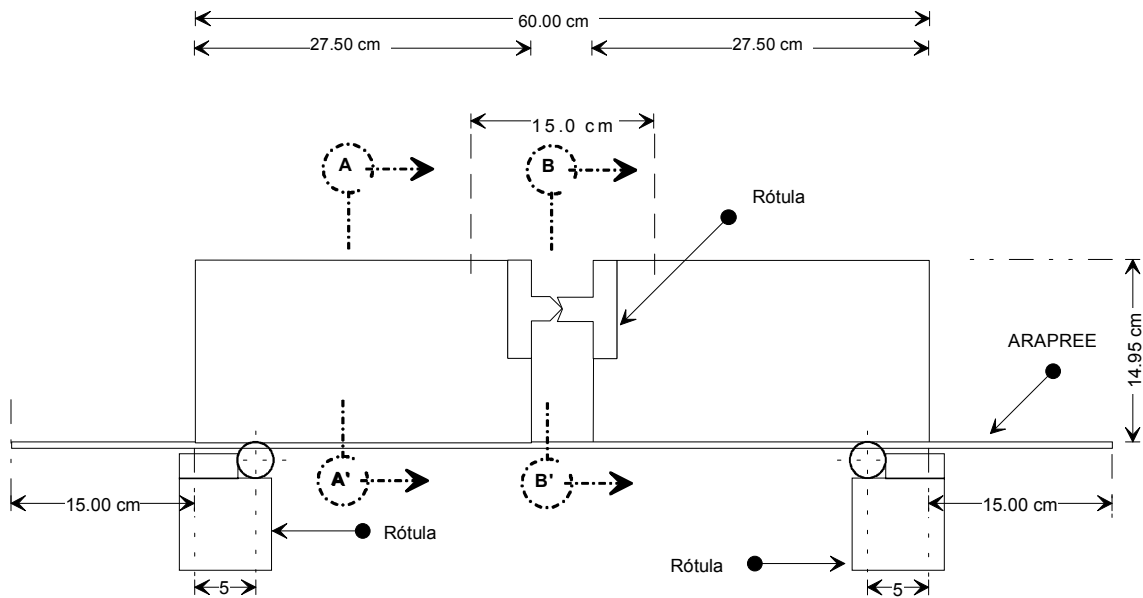
$$M = \frac{P}{4} \times (50 - 15) = P \times \frac{35}{4} = 8.75P$$

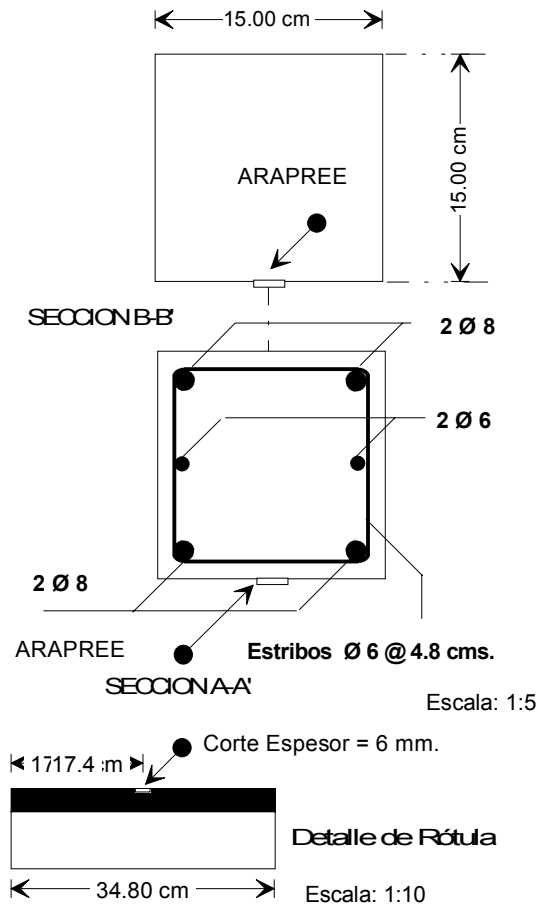
$$T = \frac{8.75P}{7} = 1.25 \times P \quad T = A_s \times \sigma_s$$

$$\tau = \frac{T}{\pi \times d \times l \times d} = \frac{1.25P}{\pi \times d \times (8.75 \times d)} = \frac{\sigma_s}{35}$$

ENSAYO	P Tm.	P Kg.	M Kg.-cm.	T Kg.	$\sigma$ Kg/cm <sup>2</sup>	$\tau$ Kg/cm <sup>2</sup>
EA_ACE_1	8.0941325	8094.132	70823.66	10117.67	5032.16	143.78
EA_ACE_2	7.858086	7858.086	68758.25	9822.61	4885.41	139.58
EA_ACE_3	8.4031165	8403.117	73527.27	10503.90	5224.26	149.26

SERIE EA\_APE





$$M = \frac{P}{2} \times \left( \frac{l}{2} \times \frac{a}{2} \right) = \frac{P}{4} \times (l - a)$$

$$T = \frac{M}{z}$$

$$T = \tau \times \text{perimetro} \times ld$$

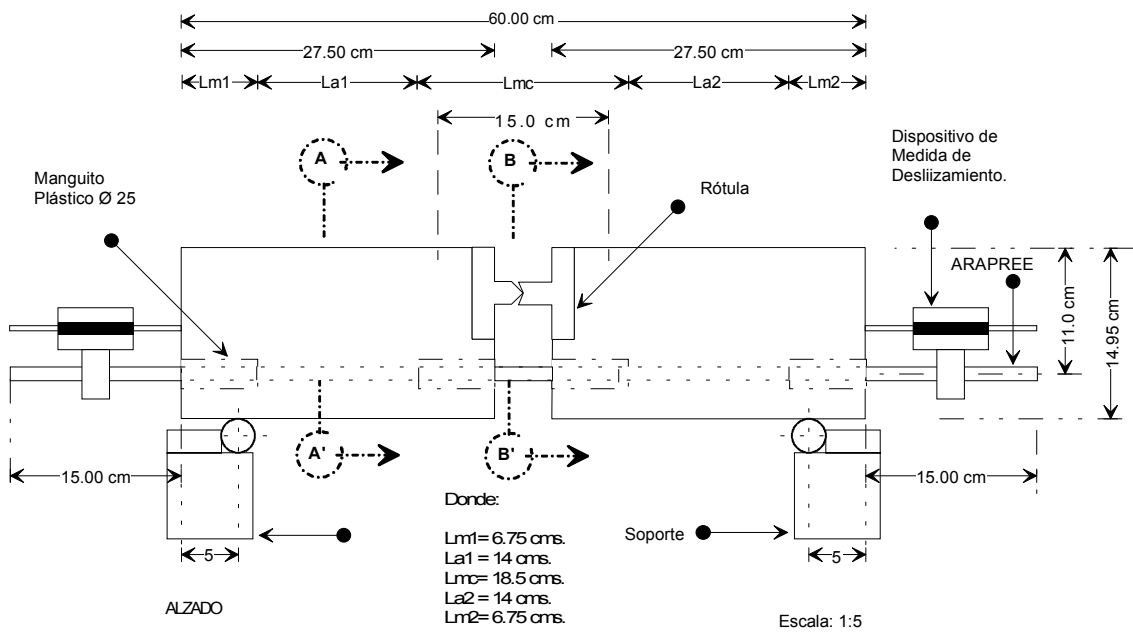
$$M = \frac{P}{4} \times (50 - 15) = P \times \frac{35}{4} = 8.75P$$

$$T = \frac{8.75P}{11.2} = 0.78125 \times P$$

$$\tau = \frac{T}{\text{perimetro} \times ld} = \frac{0.78125P}{2 \times 27.5} = 0.0142P$$

ENSAYO	P Tm.	P Kg.	M Kg.-cm.	T Kg.	$\tau$ Kg/cm <sup>2</sup>
EA_APE_1	2.128988	2128.99	18628.65	1663.27	30.24
EA_APE_2	2.50671	2506.71	21933.71	1958.37	35.61
EA_APE_3	2.6	2600.0	22750	2068.18	37.60

SERIE EA\_ARA



$$M = \frac{P}{2} \times \left( \frac{l}{2} \times \frac{a}{2} \right) = \frac{P}{4} \times (l - a)$$

$$T = \frac{M}{z}$$

$$T = \tau \times \text{perimetro} \times ld$$

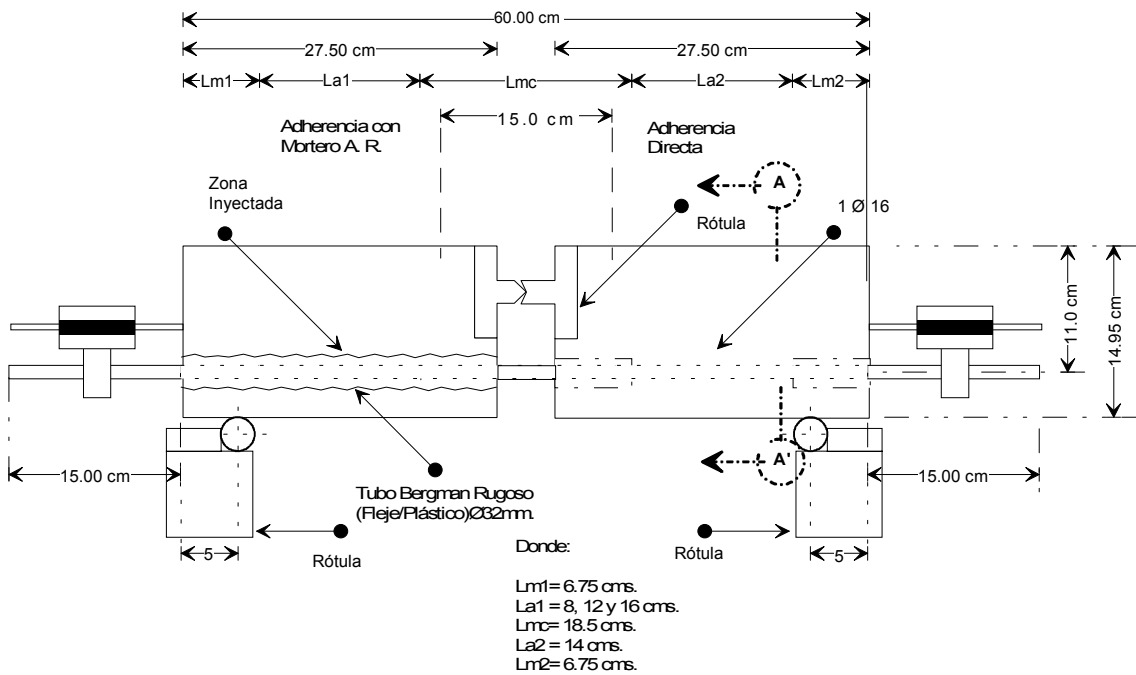
$$M = \frac{P}{4} \times (50 - 15) = P \times \frac{35}{4} = 8.75P$$

$$T = \frac{8.75P}{7} = 1.25 \times P \quad T = A_s \times \sigma_s$$

$$\tau = \frac{T}{\pi \times d \times l \times d} = \frac{1.25P}{\pi \times d \times (8.75 \times d)} = \frac{\sigma_s}{35}$$

ENSAYO	P Tm.	P Kg.	M Kg.-cm.	T Kg.	$\tau$ Kg/cm <sup>2</sup>
EA_ARA_1	3.724019	3724.019	32585.17	4655.02	69.27
EA_ARA_2	3.8873889	3887.389	34014.65	4859.24	72.31
EA_ARA_3	3.8001132	3800.113	33250.98	4750.14	70.69

SERIE EA\_MI



$$M = \frac{P}{2} \times \left( \frac{l}{2} \times \frac{a}{2} \right) = \frac{P}{4} \times (l - a)$$

$$T = \frac{M}{z}$$

$$T = \tau \times \text{perimetro} \times ld$$

$$M = \frac{P}{4} \times (50 - 15) = P \times \frac{35}{4} = 8.75P$$

$$T = \frac{8.75P}{7} = 1.25 \times P \quad T = A_s \times \sigma_s$$

$$\tau = \frac{T}{\pi \times d \times l \times d} = \frac{1.25P}{\pi \times d \times (8.75 \times d)} = \frac{\sigma_s}{35}$$

ENSAYO	P Tm.	P Kg.	M Kg.-cm.	T Kg.	$\sigma$ Kg/cm <sup>2</sup>	$\tau$ Kg/cm <sup>2</sup>
EA_MI_1	5.1911653	5191.165	45422.696	6488.957	3227.37	161.37
EA_MI_1	6.2694965	6269.496	54858.094	7836.871	3897.78	194.89
EA_MI_2	8.7702648	8770.264	76739.817	10962.831	5452.52	181.75
EA_MI_2	8.3093441	8309.344	72706.761	10386.680	5165.96	172.20
EA_MI_3	11.849611	11849.611	103684.09	14812.014	7366.96	184.17
EA_MI_3	11.708687	11708.687	102451.01	14635.859	7279.35	181.98



## RESUMEN

En la siguiente tabla se presentan los valores medios obtenidos en las diferentes series de ensayos para determinación de Adherencia:

ENSAYO	ld cm	P Tm.	Tm/cm <sup>2</sup>	P kN	$\tau$ Kg/cm <sup>2</sup>
EA_ACE	14	8.1166	0.144	81.17	144.17
EA_APE	27.5	2.41	0.034	24.1	34.86
EA_ARA	27.5	3.8	0.070	38	70.68
EA_MI_1	8	5.73	0.178	57.3	178.12
EA_MI_2	12	8.54	0.177	85.4	176.97
EA_MI_3	16	11.78	0.183	117.8	183.09

